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MIND IN MAN AND BRUTE.

Mental Evolution in Man: Origin of Human Faculty. By G. J. Romanes, M.A., LL.D., F.R.S. (London: Kegan Paul, Trench, and Co., 1888.)

THE subject with which Mr. Romanes deals in this volume is one which presents great, if not insuperable, difficulties. Whether or not there be a difference in kind—that is, in origin—between the mind of man and the mind of the brute, it is only in terms of the former that the latter can be interpreted. We can only reach minds other than our own by an ejective process of inference. Fully admitting that the evidence is amply sufficient to justify us in inferring the existence of mental processes in our dumb companions, the fact remains that there are enormous difficulties in getting at the nature of these mental processes. Our mental life is carried on in a rare atmosphere of self-conscious conceptual thought. And before we can put ourselves ejectively into the place of the brute, we have to divest ourselves of our conceptual habiliments; nay, more, we have—if current views be correct—to strip off the inner garment of our self-consciousness. Hence, some thinkers are driven to the extremity of agnosticism in this matter, and hold with Prof. Max Müller that, "according to the strict rules of positive philosophy, we have no right to assert or deny anything with reference to the so-called mind of animals." This, no doubt, is going too far. But, seeing that mind in the animal world and in very young children has to be interpreted not only by, but also in terms of, human consciousness, it behoves the investigator to at least express his opinions with becoming modesty. I cannot say that Mr. Romanes's modesty is obtrusive. There is, indeed, a tone of "cocksureness" ill befitting the subject in hand, and painfully marring the dignity of a work the ability and earnestness of which are conspicuous.

The problem which Mr. Romanes has set himself to solve in this volume is the genesis of self-consciousness and conceptual thought. He therefore begins by analyzing and classifying *ideas*. "Psychologists," he says, "are agreed that what they call particular ideas, or ideas of particular objects, are of the nature of mental images, or memories of such objects—as when the sound of a friend's voice brings before my mind the idea of that particular man. Psychologists are further agreed that what they term general ideas arise out of an assemblage of particular ideas, as when, from my repeated observation of numerous individual men, I form the idea of man, or of an abstract being who comprises the resemblances between all these individual men, without regard to their individual differences. Hence, particular ideas answer to percepts, while general ideas answer to concepts." This twofold classification, thus broadly and somewhat unsatisfactorily stated, Mr. Romanes deems inadequate. Defining *idea* as a generic term to signify indifferently any product of imagination, from the memory of a sensuous impression up to the result of the most abstract generalization, he classifies as under.

A "simple idea," "particular idea," or "concrete idea," is the mere memory of a particular sensuous perception.

A "compound idea," "complex idea," or "mixed idea," is the combination of simple ideas into that kind of composite which is possible without the aid of language.

A "general idea," "abstract idea," "concept," or "notion," is that kind of composite idea which is rendered possible by the aid of language, or by the process of naming abstractions as abstractions.

With regard to these, he says that the first division has to do only with what are termed percepts, while the last has to do with what are termed concepts. And there being no word to meet the middle division, he coins the term *recept* (= generic idea), which appears to him exactly to meet the requirements of the case, because in *receiving* such ideas the mind is passive, whereas in conceiving abstract ideas the mind is active.

I do not regard this classification as very satisfactory, and I doubt whether it will find much favour among modern psychologists. Regarding, as I do, every percept as a synthesis effected by the mind at the bidding of a sense-impression, I am not prepared to regard the mind as passive in what Mr. Romanes calls "reception." And I think that a subdivision of percepts into particular and generic would have been sufficient to meet all the requirements of Mr. Romanes's argument. As it is, he narrows down perception to a very limited province; for he admits that the ideation of infants is from the first generic. Throughout the whole of this chapter on *ideas*, Mr. Romanes seems to ride the "sensitive plate" analogy too hard. His percepts are photographs of particular objects; his recepts are composite photographs, like Mr. Galton's picture of the average blackguard. But this is to lose sight of the activity of mind, which, automatic though it be, is none the less real. In the great body of percepts and recepts there is far more give than take in the mental operation involved.

Turning to one of the examples of what, I presume, Mr. Romanes regards as a recept, he says: "All the higher animals have general ideas of 'good-for-eating' and 'not-good-for-eating,' *quite apart from any particular objects of which either of these qualities happens to be characteristic.*" I very much question whether any animals have the power of isolating qualities, implied in the words I have italicized. Nor should I call the idea of such an isolated quality either a percept or a recept. A dog may, by an automatic action of the mind, build into his percepts or recepts the element of niceness or nastiness as part of the object constructed by mental synthesis. But this is a very different thing from having a general (or generic) idea of niceness or nastiness apart from the object. Such an idea is the result of analysis, and the hanging of the isolated results of analysis on separate name-pegs.

Much of Mr. Romanes's work is necessarily devoted to language, and here, although he does not profess to speak as an expert, will be found much that will repay careful perusal. He introduces the term "denominative" for a sign consciously bestowed as such with a full conceptual appreciation of its office and purpose as a name. He considers that a parrot may use *bow-wow* as a denotative sign for a particular dog, and then extend it to other dogs, thus using it as a connotative sign. No parrot, however, could employ a word in its truly denominative sense. This is a conceptual, as opposed to a merely receptual, act. Natural or conventional signs may thus be built, by the animal, into the structure of its percepts or recepts. They cannot be consciously given for the purposes of conceptual thought. Mr. Romanes, at this stage of his inquiry, extends his classification, marking off four stages of ideation.

(1) *Lower recepts*, comprising the mental life of all the lower animals, and so including such powers of receptual connotation as a child when first emerging from infancy shares with a parrot.

(2) *Higher recepts*, or *pre-concepts*, comprising all the extensive tract of ideation that belongs to a child between the time when its powers of receptual connotation first surpass those of a parrot up to the age at which connotation as merely connotative begins to become denominative.

(3) *Lower concepts*, comprising the province of conceptual ideation when this first emerges from the higher receptual, up to the point where denominative connotation has to do, not merely with the naming of recepts, but also with that of associated concepts.

(4) *Higher concepts*, comprising all the further excellencies of human thought.

With this apparatus of terms, Mr. Romanes is prepared to enter upon the question of self-consciousness, which, he says, consists in paying that same kind of attention to internal or psychical processes as is habitually paid to external or physical processes, or in bringing to bear upon subjective phenomena the same powers of perception (*sic*) as are brought to bear upon the objective. I question whether Mr. Romanes's opponents will be quite satisfied with this definition. Starting with it, however, Mr. Romanes contends that, "given the protoplasm of the sign-making faculty so far organized as to have reached the denotative stage; and given also the protoplasm of judgment so far organized as to have reached the stage of stating a truth without the mind being yet sufficiently developed to be conscious of itself as an object of thought, and therefore not able to state to itself a truth as true; by a confluence of these two protoplasmic elements an act of fertilization is performed, such that the subsequent processes of mental organization proceed apace, and soon reach the stage of differentiation between subject and object." In working out this contention he makes use of the fact that a large number of the recepts of the brute have reference, not to objects of sense, or even to muscular sensations, but to the mental states of other animals. We wish he had given us more information on this head—not as to the fact, which can hardly be questioned, but as to the mode of origin of this ejective element, and as to how far such an element modifies the perceptual or receptual nature of the mental product or synthesis into which it enters. The ejective element is so purely inferential, and would seem to be reached by so indirect a process through the mental states of the animal itself, that further information on Mr. Romanes's view of the matter would have been welcome. Proceeding, however, from this basis, he takes it to be a matter of general observation that animals habitually and accurately interpret the mental states of other animals, while they well know that other animals are similarly able to interpret theirs—as is best proved by their practising the arts of cunning, concealment, hypocrisy, &c. Thus the truth is "gradually borne in upon the mind of an animal that it is a separate individuality; and this, though it is conceded that the animal is never able, even in the most shadowy manner, to think about itself as such. In this way there arises a sort of 'outward self-consciousness,' which differs from true or inward self-consciousness only in the absence of any attention being directed upon the inward mental states as such." Turning then from the animal to the child, Mr. Romanes contends that at an early age he only possesses outward or receptual self-consciousness. As yet he has paid no *attention* to his own mental states further than to feel that he feels them: he speaks to and of himself in the third person or by his proper name. "The change of a child's phraseology from speaking of self as an object to speaking of self as a subject does not take place—or but rarely so—till the third year. When it has taken place, we have definite evidence of true self-consciousness, though still in a rudimentary stage." These in brief—and it is difficult to condense the argument into a small compass—are the steps by which Mr. Romanes ascends to rudimentary self-consciousness as it first dawns upon the child-mind. I find myself unable either to accept or to criticize Mr. Romanes's account of the genesis of self-consciousness. I have read and re-read it, but find myself incapable of thinking myself into the gradually ascending stages. I fail adequately to imagine the mental condition of the dog or the very young child in which outward or receptual, and eventually inward or conceptual, self-consciousness is being evolved. I believe with Mr. Romanes that the evolution has taken place; but I fail to realize the *how*. This is, of course, not his fault: he gives me the steps of the process; he cannot give me the capacity to conceive them. In any case, Mr. Romanes claims to have shown—and how far the claim is justifiable the reader must determine for himself—"that, in whatever way we regard the distinctively human faculty of conceptual predication, it is proved to be but a higher development of that faculty of receptual communication, the ascending degrees of which admit of being traced through the brute creation up to the level which they attain in a child during the first part of its second year,—after which they continue to advance uninterruptedly through the still higher receptual life of the child, until, by further though not less imperceptible growth, they pass into the incipiently conceptual life of the human mind."

I have left myself no space to deal with the purely philological part of the work. I may note, however, that, in speaking of the roots into which language may be analyzed, Mr. Romanes contends that they can only be regarded as original or primary in the sense that they are the ultimate results of analysis, *i.e.* that they are not original in the sense of representing the ideation of really primitive man; and, again, that they for the most part stand for named recepts or lower concepts, and in a comparatively small degree for higher concepts or the results of conceptual analysis. In both these contentions I conceive he is right. Speaking as a layman of the work of one who freely admits that he is not an expert, the philological analysis seems to me extremely well done.

In conclusion, I would congratulate Mr. Romanes on this his latest volume, which undoubtedly contains much excellent and painstaking work. If I am not altogether satisfied with his psychology; if I am unable to agree with him that "the phases of development which have gradually led up to conceptual thought admit of being as clearly traced as those which have led to any other product, whether of life or of mind"; if I even go further, and confess my belief that mental evolution never will be and never can be independently established, though it may be accepted as a corollary from organic evolution by those who are content to remain naturalists:—this does not lead me to welcome any the less cordially the valuable researches of Mr. Romanes in a very interesting but exceedingly difficult field of investigation.

C. LLOYD MORGAN.

THE MICROSCOPICAL STUDY OF MINERALS IN ROCKS.

Microscopical Physiography of the Rock-making Minerals: an Aid to the Microscopical Study of Rocks. By H. Rosenbusch. Translated and Abridged for use in Schools and Colleges by Joseph P. Iddings. Illustrated by 121 Woodcuts and 26 Plates of Photomicrographs. (New York: John Wiley and Sons. London: Macmillan and Co., 1888.)

Hülfstabellen zur mikroskopischen Mineralbestimmung in Gesteinen. Zusammengestellt von H. Rosenbusch. (Stuttgart: E. Koch, 1888.)

Les Minéraux des Roches. Par A. Michel-Lévy et Alf. Lacroix. (Paris: Libraire Polytechnique, Baudry et Cie. 1888.)

IT has been well said that this is an age of books. With equal propriety it might be characterized as an age of text-books. Indeed, so rapidly do these aids to learning increase and multiply, that it seems almost incredible that any rational proportion can still exist between demand and supply. In works on petrography, the year just passed away has been exceptionally fruitful. From the ponderous tome, replete with detail and illustrated by magnificent plates, down to the superficial shilling primer, we have before us a remarkable series of volumes in which rocks and their constituent minerals are treated from all the most recent points of view. It was in the early months of 1888 that Prof. Rosenbusch's invaluable "Mikroskopische Physiographie," was completed by the publication of the second part of Volume II., and the same year has also witnessed the appearance of Mr. J. P. Iddings's translation of the first volume, on the "Mikroskopische Physiographie der petrographisch wichtigen Mineralien." The usefulness of this book as a work of reference cannot be over-rated, as will be acknowledged by all those who have had occasion to use it. Unfortunately, it has hitherto been sealed to those who possessed no knowledge of German, and Mr. Iddings has earned the thanks of English-speaking petrographers in undertaking its translation, a task involving no inconsiderable amount of patient labour.

In the English edition the book has been slightly abridged, but in doing this the translator has "endeavoured to retain all that appeared essential to a fair general comprehension of the subject, omitting what seemed to be refinements beyond the need of the average student, and for which the advanced student is referred to the original work. Thus most of the historical portions have been omitted, as well as the elaborate treatment of the optic anomalies of certain minerals, and many notes on European localities; while a number of notes on American occurrences have been inserted." We cannot help thinking, however, that it would have been an advantage to retain the alphabetical index to petrographical literature, which, on account of its completeness, forms one of the most valuable features of Prof. Rosenbusch's work. Reference to original sources should be encouraged to the utmost in a students' book.

Mr. Iddings has added some useful information on allanite, or orthite, as some prefer to name it. According to his researches, carried out in conjunction with Mr. Whitman Cross, the occurrence of this mineral as an accessory constituent of rocks is much more wide-spread than is usually supposed. These authors have shown it to be widely distributed through a great variety of rocks in the United States, it having been found in gneiss, granite, granite-porphyry, quartz-porphyry, diorite-porphyrite, andesite, dacite, and rhyolite. It is possible that it has sometimes escaped recognition, owing to its resemblance in colour and pleochroism, to some varieties of hornblende and biotite. It may, however, be distinguished from the former by its higher double refraction, and from the latter by its larger optic axial angle.

The translator must be congratulated on the very successful way in which he has rendered the original into clear and concise English, while keeping strictly within the author's meaning; indeed, were any fault to be found with Mr. Iddings's style, it would perhaps be that he has a tendency to translate too literally. But this is erring on the safe side. Occasionally, however, he goes to the other extreme, the translation becoming so free as to be inaccurate, as, for instance, when "*crystallinische Schiefer*" is rendered "Archæan formation," so that phenomena of dynamic metamorphism (such as the marginal crushing of crystals, or "cataclastic structure"), that are common to the crystalline schists of whatever age, are thereby limited, inferentially of course, to rocks of Archæan age (pp. 251, 277, 279, 284, 307, 309, 310). The word *Sphärokrystal* has been rendered *spherulite*, on the ground that the latter has become well established in English literature. This is true; but the word spherulite is equally well known in Germany. On p. 392 of the "Physiographie der massigen Gesteine," Prof. Rosenbusch carefully distinguishes between the meanings he attaches to *spherocrystal* and *spherulite* respectively; the former being applied by him to spherular bodies consisting of radially-aggregated fibres of a single mineral (*e.g.* chlorite), the latter to those imperfectly individualized fibrous bodies so common in vitreous rocks.

In one or two instances only has Mr. Iddings been led astray by the peculiarities of the German idiom. The most serious of these slips occurs on p. 286, where we read that, "in the so-called pseudomorphs of cassiterite after orthoclase from Huel Coates, tourmaline and quartz, besides cassiterite, *form a principal part of the muscovite.*" The meaning of the original, which is, it is true, somewhat ambiguously expressed, is, that besides cassiterite, tourmaline, and quartz, muscovite forms one of the principal constituents of the pseudomorphs after orthoclase from Huel Coates.[1]

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[1] "Auch bei der sog. Pseudomorphose von Cassiterit nach Orthoklas von Huel Coates im Kirchspiel St. Agnes, Cornwall, bildet neben Cassiterit, Turmalin und Quarz der Muscovit einen Hauptgemengtheil."